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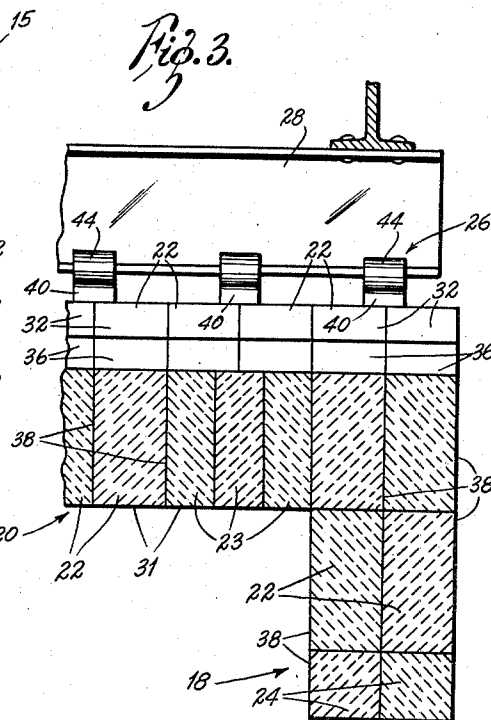
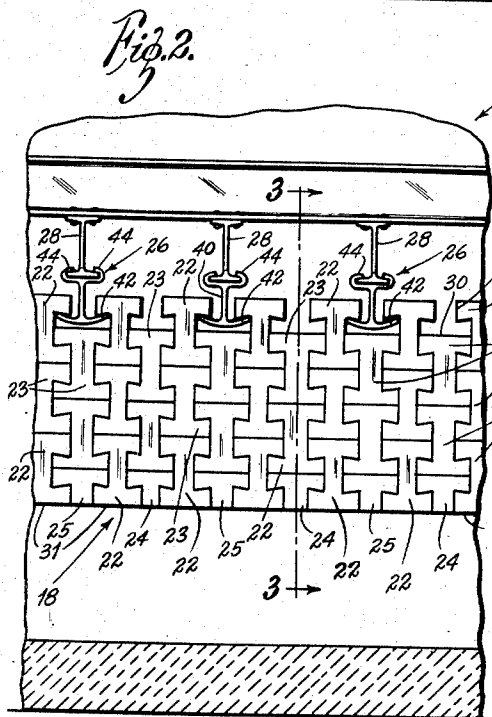
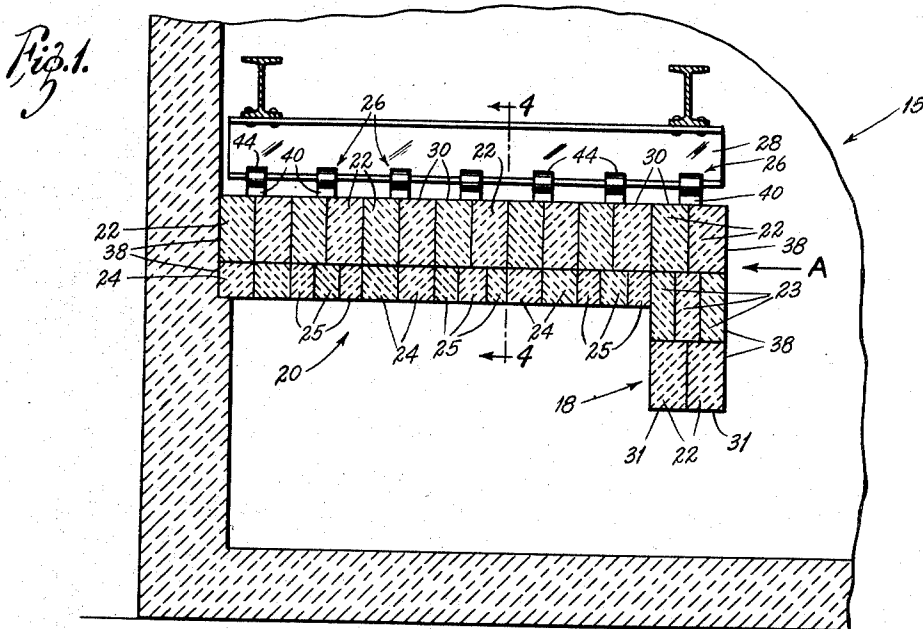
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2,699,740

FURNACE ARCH AND CURTAIN WALL CONSTRUCTION

Filed June 10, 1949

3 Sheets-Sheet 1



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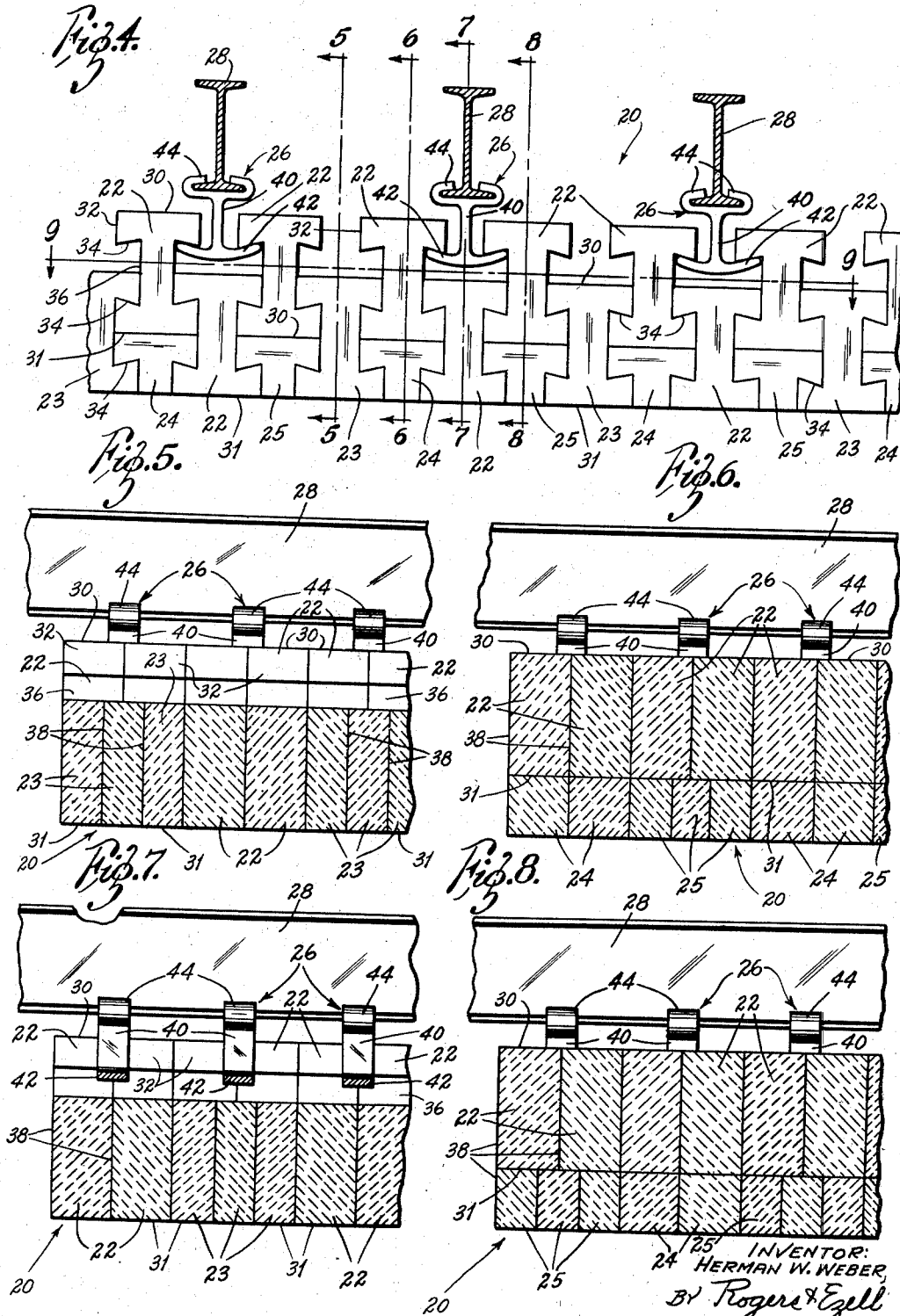
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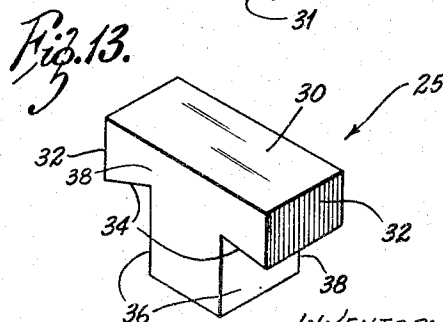
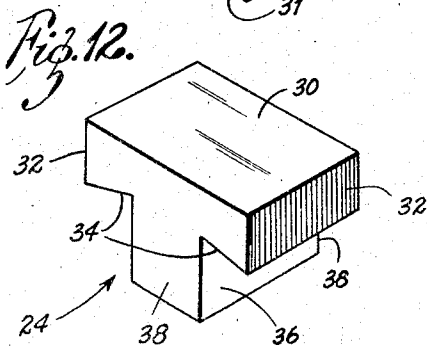
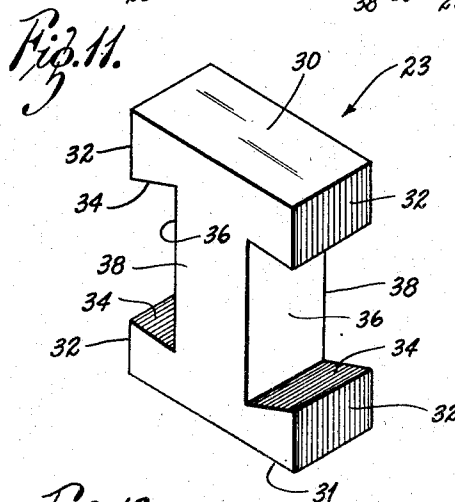
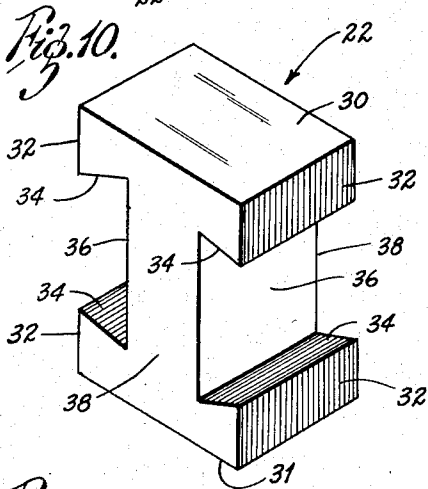
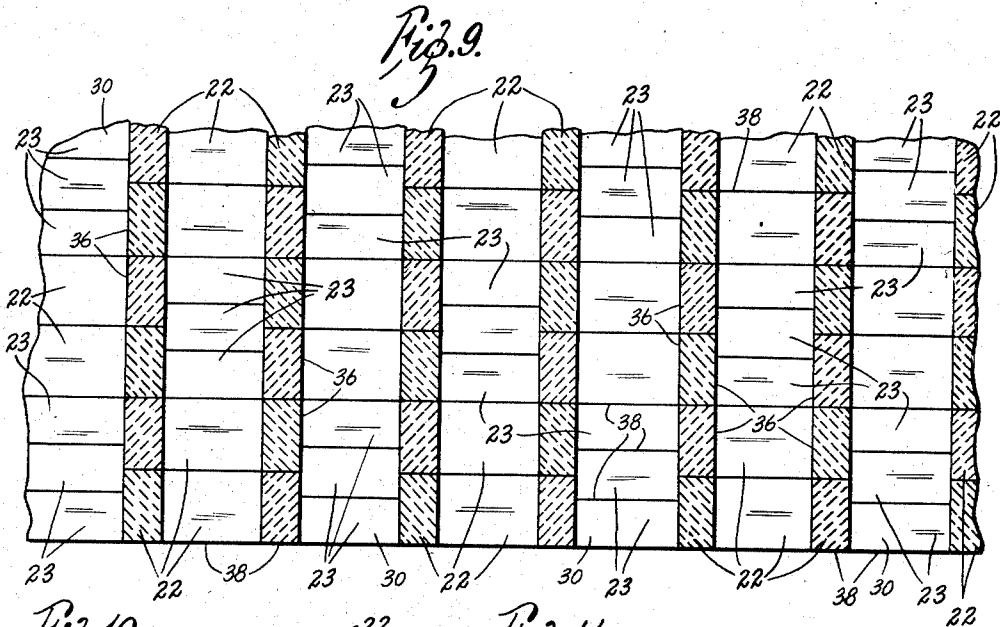
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FURNACE ARCH AND CURTAIN WALL CONSTRUCTION

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3 Sheets-Sheet 3



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2,699,740

FURNACE ARCH AND CURTAIN WALL CONSTRUCTION

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2 Claims. (Cl. 110—99)

The present invention relates generally to refractory constructions, and more particularly to a refractory furnace arch and curtain wall, and to the component refractory elements thereof.

In general, the present invention comprises a furnace arch and curtain wall formed of dovetailed or interlocking novel tiles of predetermined different thicknesses arranged to eliminate or to minimize through joints, and suspended in the main in spaced relation from the supporting hangers and beams, the curtain wall being suspended.

Hence, an object of the present invention is to provide a novel refractory arch and curtain wall formed of dovetailed or interlocking tiles.

Another object is to provide a novel curtain wall which is suspended from a support disposed above its upper reach, and is free of metal or other supports adjacent its outer vertical surface.

Another object is to provide a novel refractory arch and curtain wall for furnaces and the like formed to eliminate through joints.

Another object is to provide a novel refractory arch and curtain wall for furnaces and the like in which the tiles are spaced below the hanger members to provide an air space.

Another object is to provide a novel curtain wall which is formed of tiles which may be readily replaced in damaged areas without a major dismantling job.

Another object is to provide a novel refractory arch and curtain wall for furnaces and the like formed of interlocking tiles of a minimum number of predetermined shapes and thicknesses which resist and prevent shifting movement throughout the entire mass.

Another object is to provide a novel refractory arch and curtain wall for furnaces and the like formed of interlocking tiles arranged to eliminate through joints which comprise but a single tile shape of two thicknesses and a single half tile of the same shape of two thicknesses.

Another object is to provide a novel tile having interlocking characteristics.

Another object is to provide a novel tile having interlocking characteristics which combines with half tiles of the same shape to effect a solid arch, curtain wall, or the like.

Another object is to provide a novel tile which is of a form to reduce to a minimum the tile shapes required to form a solid arch or curtain wall for furnaces and the like.

Other objects are to provide a novel refractory arch and curtain wall for furnaces and the like which are relatively inexpensive, which are readily constructed, which reduce heat damage to hanger members, which are rugged and longlasting, and which require a minimum of maintenance.

The foregoing and other objects and advantages are apparent from the following description taken with the accompanying drawings, in which:

Fig. 1 is a diagrammatic cross-sectional view through a forging furnace constructed in accordance with the teachings of the present invention, illustrating an arch and a curtain wall;

Fig. 2 is an enlarged fragmentary elevational view of the curtain wall looking in the direction of the arrow A;

Fig. 3 is a vertical cross-sectional view on substantially the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary vertical transverse cross-sectional view through the furnace arch of Fig. 1 taken on substantially the line 4—4 thereon;

Figs. 5, 6, 7, and 8 are longitudinal vertical fragmentary

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cross-sectional views on substantially the lines 5—5, 6—6, 7—7, and 8—8, respectively, of Fig. 4;

Fig. 9 is a fragmentary horizontal cross-sectional view taken on substantially the line 9—9 of Fig. 4;

Fig. 10 is an isometric view of a refractory tile formed in accordance with the teachings of the present invention;

Fig. 11 is an isometric view of a refractory tile of the same shape as that of Fig. 10, but of a fraction of the thickness;

Fig. 12 is an isometric view of a half tile of the shape of that of Fig. 10; and

Fig. 13 is an isometric view of a half tile of the shape of that of Fig. 11.

Referring to the drawings more particularly by reference numerals, 15 indicates generally a forging furnace which includes an arch 20 and a suspended curtain wall 18 formed in accordance with the principles of the present invention. Manifestly, the arch 20 and curtain wall 18 may be of any size. Both the arch 20 and the curtain wall 18 comprise interlocked mortar bound refractory tiles 22 and 23 and refractory half tiles 24 and 25 suspended from hanger members 26 carried by supporting members 28.

Each tile 22 is in the form of a double headed T including parallel upper surface 30 and lower surface 31, parallel end surface segments 32, angularly directed undercut end surfaces 34, parallel inset end surfaces 36, and parallel side surfaces 38 (Fig. 10). Preferred dimensions of the tile 22 are 6" x 9" x 4½". The vertical height of each inset end surface 36 is substantially twice that of an end surface segment 32, as is clear from Fig. 4, to insure snug dovetailing.

The tiles 23 are identical with the tiles 22 except for thickness, preferably being two-thirds that of the tiles 22, or 3" in the instant illustration (Fig. 11). The same reference numerals designate like surfaces.

Similarly, the half tiles 24 are identical with either half of the tiles 22 (Fig. 12), and the half tiles 25 are identical with either half of the tiles 23 (Fig. 13), the same reference numerals being employed.

Each hanger member 26 includes a web 40, lower arcuate flanges 42, and hook flanges 44. The hanger members 26 may be of any desired thickness of height, being shown of a thickness to readily support two adjacent tiles and of a height to easily receive surface segments 32 between vertically spaced flanges 42 and 44.

It is clear from the drawings that the supporting members 28, shown as I beams, receive the hook flanges 44 of spaced hanger members 26. Each hanger member 26 supports two adjacent tiles 22 or 23 at each side through engagement of the flanges 42 with undercut end surfaces 34 which, in turn, support other tiles. The several tiles 22 and 23 and half tiles 24 and 25 are interlocked in a predetermined pattern, such as that illustrated, to eliminate continuous or through joints. The thickness of the arch 20 may be of any selected half tile increment, as is clear from Fig. 4, and the curtain wall 18 may be of any depth within the shearing strength of the tiles.

The curtain wall 18 is suspended by the end hanger members 26 directly from the supporting members 28 which do not extend beyond the curtain wall 18 (Fig. 1). Hence, there are no metal beams or brackets adjacent the outer face of the curtain wall 18 to be destroyed by the intense heat of externally licking flames of the forging furnace 15 in its normal operation.

It is to be noted that the curtain wall 18 may be readily repaired in damaged spots without complete dismantling, since one or more tiles may be loosened and punched out, and new tiles inserted.

The particular tile pattern of the arch 20 and curtain wall 18 may be changed widely, limited only by the fact that the tiles 23 are two-thirds the thickness of the tiles 22.

The dovetailing or interlocking characteristic of the several tiles prevents separation of the elements of the arch 20 and curtain wall 18 in use. Additionally, this feature helps to support the arch 20 and curtain wall 18 and reduces the number of hanger members 26 required.

The formation of the several tiles insures an air space

beneath the hanger members 26, which adds to the long life of the latter.

It is clear from the foregoing that there have been provided an arch and curtain wall, and a novel tile, which fulfill all of the objects and advantages sought therefor.

It is to be understood that the foregoing description and the accompanying drawings have been given by way of illustration and example. It is also to be understood that changes in form of the elements, rearrangement of parts, and substitution of equivalent elements, which will be obvious to those skilled in the art, are contemplated as within the scope of the present invention, which is limited only by the claims which follow.

What is claimed is:

1. In combination, arch construction comprising a plurality of interlocking tiles forming a composite mass of selected thickness, adjacent tiles being interlocked so that a chain lock effective to prevent transverse separation of tiles obtains in one direction across the mass of tiles, a predetermined number of said tiles being formed as a double-ended T including a stem and four arms, the inner side of each of the four arms being in converging relation to the outer side thereof when considered from the outer end of each toward the stem, each upper arm of the double-ended T tiles in the tile mass resting on a lower arm of an adjacent double-ended T tile, means suspending said tile mass, and a curtain wall depending from said arch construction formed of interlocking members identical with those aforementioned, adjacent tiles of said curtain wall being interlocked so that a chain lock effective to prevent transverse separation of tiles obtains in one direction across the mass of tiles, a predetermined number of said tiles being formed as a double-ended T including a stem and four arms, the inner side of each of the four arms being in converging relation to the outer side thereof when considered from the outer end of each toward the stem, each upper arm of the double-ended T tiles in the tile mass resting on a lower arm of an adjacent double-ended T tile, the upper double-ended T tiles of said curtain wall being interlocked with and depending from double-ended T tiles of the arch portion thereabove, said curtain wall being formed of and supported by tiles as aforesaid and thereby being free of flame-vulnerable outer face supports in the flame path.

2. In combination, arch construction comprising a plurality of interlocking tiles forming a composite mass of

selected thickness, adjacent tiles being interlocked so that a chain lock effective to prevent transverse separation of tiles obtains in one direction across the mass of tiles, a predetermined number of said tiles being formed as a double-ended T including a stem and four arms, a predetermined number of said tiles being formed as T's including a stem and two arms, the inner side of each of the four arms and each of the two arms being in converging relation to the outer side thereof when considered from the outer end of each toward the stem, each lower arm of each double-ended T tile receiving an upper arm of an adjacent tile, means suspending said tile mass, and a curtain wall depending from said arch construction formed of interlocking members identical with those aforementioned, adjacent tiles of said curtain wall being interlocked so that a chain lock effective to prevent transverse separation of tiles obtains in one direction across the mass of tiles, a predetermined number of said tiles being formed as a double-ended T including a stem and four arms, the inner side of each of the four arms being in converging relation to the outer side thereof when considered from the outer end of each toward the stem, each upper arm of the double-ended T tiles in the tile mass resting on a lower arm of an adjacent double-ended T tile, the upper double-ended T tiles of said curtain wall being interlocked with and depending from double-ended T tiles of the arch portion thereabove, the upper portions of said upper double-ended T tiles of said curtain wall replacing T tiles in said arch, said curtain walls being formed of and supported by tiles as aforesaid and thereby being free of flame-vulnerable outer face supports in the flame path.

References Cited in the file of this patent

UNITED STATES PATENTS

783,133	Poppenhusen	Feb. 21, 1905
812,072	McClave	Feb. 6, 1906
952,232	Cheney	Mar. 15, 1910
991,896	Sajo	May 9, 1911
1,443,487	Liptak	Jan. 30, 1923
1,457,443	Liptak	June 5, 1923
1,462,267	De Wolf	July 17, 1923
1,585,003	Wilson	May 18, 1926
1,606,315	Morris	Nov. 9, 1926
1,705,965	De Wolf	Mar. 19, 1929
1,710,247	Stevens	Apr. 23, 1929